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Responsible Office: Facilities Engineering and Real Property Division

| TOC | Change | Preface | Chp1 | Chp2 | Chp3 | Chp4 | Chp5 | Chp6 | Chp7 | Chp8 | Chp9 | Chp10 | Chp11 | Chp12 | AppdxA | AppdxB | AppdxC | AppdxD | AppdxE | AppdxF | AppdxG | AppdxH | AppdxI | Fig12-2 | FigC-6 | FigC-7 | FigC-8 | FigD-1 | FigD-2 | FigD-3 | FigD-4 | FigD-5 | FigD-6 | FigD-7 | FigD-8 | FigD-9 | FigD-10 | FigD-11 | FigD-12 | ALL |

CHAPTER 12. Contract Support

12.1. General

12.1.1. Historically, NASA has contracted for support of its maintenance activities. Typically, contracts would specify a level of effort to be provided rather than specifying the results to be achieved. However, the following are some of the problems associated with that approach:

a. It provides no incentive for contractors to be innovative or efficient.

b. It is uneconomical for the Government because it hires a "marching army" of contractor employees for a term of employment, instead of contracting for a job to be completed.

c. It may foster a personal services environment wherein NASA is perceived as the "employer" who supervises the efforts of contractor "employees."

d. It can contribute to a breakdown of project discipline (e.g., when the Project Office becomes concerned with how to keep the contractor busy, unplanned and often unnecessary "extras" may be added to the contractor's tasking).

e. It creates the opportunity for unnecessary enrichment of the labor skill mix, thereby driving up labor costs.

f. It requires the Government to perform extensive surveillance because, absent clearly stated contract objectives, the contractor must receive continual clarification from Government technical representatives.

12.1.2. NASA's policy is to "Utilize performance-based contracts and best-value principles to the maximum extent feasible and practical to shift cost risk to contractors and maximize competitive pricing". It is also NASA policy to include risk management as an essential element of the entire procurement process, including contract surveillance. In following these policies NASA has committed to converting its method of procuring facilities maintenance services from a cost reimbursement approach to a fixed price, performance-based contracting approach.

12.1.3. Refer to the NASA GPWS (Guide Performance Work Statement) for Center Operations Support Services (COSS) dated March 1997 and its Addendum dated July 1999 for complete background information, guidance, and templates that may be used by the Centers for their own customized PWS and Quality Assurance Guidance that proactively considers the elements of risk management. See Paragraph 12.6, Quality Assurance.

12.2. Performance-based Contracting

12.2.1. Under the PBC concept, the Government contracts for specific services and outcomes, not resources. Contractor flexibility is increased, Government oversight is decreased, and attention is devoted to managing performance and results and ultimate outcomes.

a. The Statement of Work (SOW) contains explicit, measurable performance requirements (WHAT), eliminates process-oriented requirements (HOW), and includes only minimally essential reporting requirements that are based on risk. The Government employs a measurement method (e.g., project surveillance plan) that is clearly

communicated to the contractor, and where the contractor is held fully accountable. Incentives can be used, but must be relevant to performance and center on the areas of value to NASA and those of high risk that are within the control of the contractor. The SOW should encourage the use of contractor best practices and also include the requirement for the contractor to use cutting edge maintenance practices utilized in the private sector to give NASA the best product.

b. It is NASA's policy to maximize the use of firm-fixed-price contracts, combined with Indefinite-Delivery/Indefinite-Quantity (IDIQ) unit price provisions where necessary. In implementing this policy, as much "core" work as possible should be included in the firm-fixed-price portion of the contract. IDIQ work should be held to a minimum because of its cost.

(i) Fixed-Price Work. To shift cost risk to the contractor, fixed pricing and fixed unit pricing are used to the maximum extent feasible and practical. Because the contract requirements (time, location, frequency, and quantity) are known or adequate historical data is available to allow a reasonable estimate to be made, the contractor can agree to perform for a total price - similar to a single work order. The contractor does not get paid for work that is unsatisfactorily performed or not performed at all, and deductions are made in accordance with the Schedule of Deductions (Section E of the contract).

(ii) IDIQ Unit Price Work. Not every item of work can be adequately quantified at contract inception to allow it to be firm, fixed price. For example, few can predict the frequency and quantity of environmental spill cleanup actions that may be required over a given year, or the exact number of chairs and other preparations required for VIP visits and special occasions 2 years away. Often, too, historical data is inadequate to enable fix pricing certain services. Indefinite quantity contract requirements are performed on an "as ordered" basis. A fixed unit price to perform one occurrence or a given quantity of each type of work is bid for the requirement implementation. Payment is based on the unit price bid per unit (Section B of the contract) times the number of units performed or on an agreed-to price. Because each instance of IDIQ work is ordered and paid for separately, each and every delivery order must be inspected and accepted as being satisfactorily completed before payment is made, as if each were a separate mini-contract. Contract prices for unit priced tasks include all labor, materials, and equipment for performing that specific work. The unit prices offered are multiplied by the quantity of units estimated to be ordered during the contract term, but only for purposes of proposal evaluation, for work will only be paid for as ordered and completed.

c. The contract should be a completion type (something is accomplished) as opposed to a term/level-of-effort type of contract (effort is expended). If level of effort, staffing levels, or a skill mix of workers are specified, the contract is NOT performance based.

d. Contractor-Government partnering is highly recommended to achieve mutually supportive goals (see Paragraph 12.4, Partnering).

e. The Center Procurement Office should be contacted for assistance. The contracting officer will determine the appropriate contract type.

12.2.2. Facility Organization's Responsibilities. The Center facilities organization must work together with the users and it is recommended that the facilities organization participate in the preparation of the shaded sections shown in Figure 12-1 as a minimum and in the unshaded sections at the discretion of the Contracting Officer. This includes identifying all functions and services to be included in the contract; developing the functional tree diagram (which shows the relationships of the functions in the contract); and preparing a Work Breakdown Structure (WBS) for the technical section (Section C) and the PRS which is precisely coordinated with the tree diagram. The maintenance organization must assure the contract states that maintenance data entered in a CMMS is Government property and, as such, must be available for Government use and retention for historical purposes, regardless of who, Government or contractor, is responsible for populating and maintaining the database. Where the contractor operates the CMMS it must be made clear in the contract that the CMMS maintenance data is Government property and must be turned over to the Government at the end of the contract. The WBS must include all contract requirements to be purchased.

12.2.3. Functional Diagram. Figure 12-2 is an example of a functional diagram at one NASA Center. It represents graphically the highest level of the WBS and should be the starting point in preparing the PBC documentation. Recognize that it identifies graphically each function that is included in the performance-based contract. Each of these will be individually addressed and have a counterpart subsection in Section C where the requirements, performance indicators and other supplemental information is discussed. In this specific example, each shaded box represents a function discussed in the technical sections of the contract - Subsections C.8 through C.27. The large hashed-shaded area indicates that the five functions within it include operations support as well as maintenance. The white box functions are not in the contract, but are shown to indicate relationships. Functional diagrams will vary by Center, depending on the functions being contracted. However, its preparation and use is important and is the basis of the WBS and the contract documentation.

Figure 12-1. Contract Sections

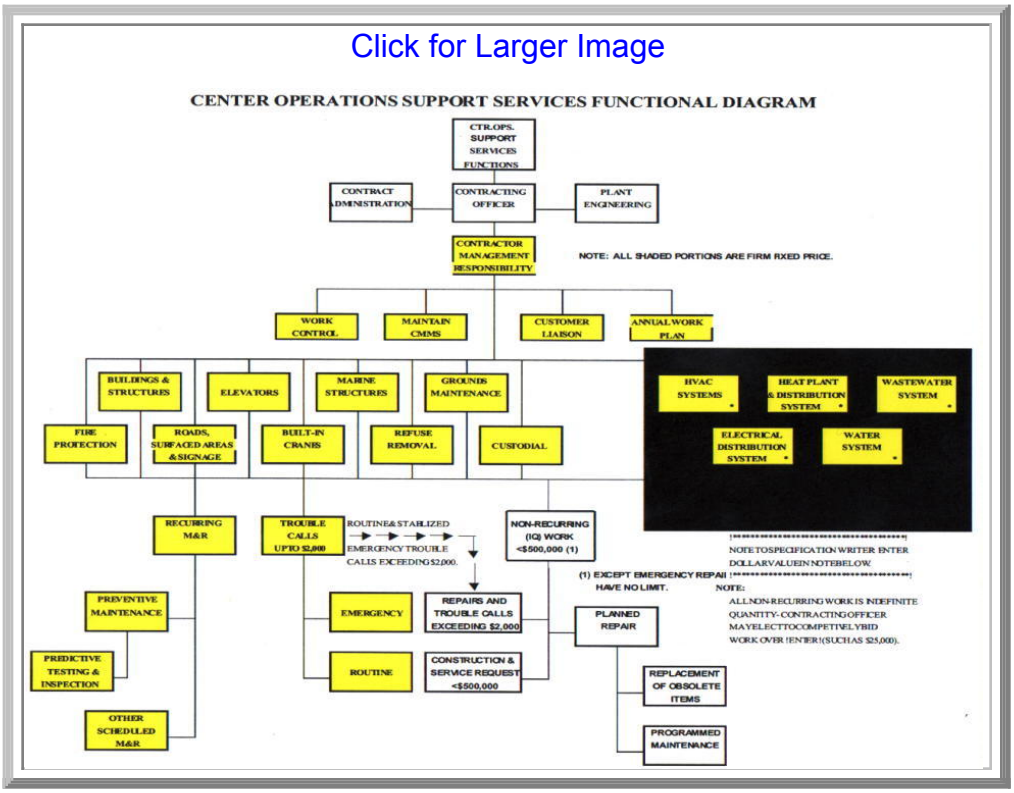

Figure 12-2. Function Diagram.

12.3. Outcome Specifications

Performance-based specifications can be stated in terms of outputs or outcomes. For example, a typical performance-based contract will have numerous output requirements for maintaining facilities, such as performing PM, testing and treating circulating water in HVAC cooling towers and performing certain operational checks. An outcome requirement, however, simply might be that "buildings are available and fully functional to the user when needed," and integrates all service necessary to produce that result. Contractor flexibility is increased by allowing the contractor to decide what work tasks are needed and to propose cutting-edge technologies and techniques that may be more effective than traditional approaches. Government oversight is decreased and attention is devoted to managing final results. A certain amount of risk is introduced for NASA by transferring additional responsibility to the contractor and therefore is not appropriate for all functions. The use of output (versus outcome) requirements is suggested in the following circumstances:

a. The Center feels that the criticality of the function is too important to allow a contractor to deviate from proven work methods.

b. There is a mandated regulation or operational procedure that requires a specific work method to be followed.

c. A mandated procedural requirement is mandatory for safety considerations.

d. The function has very high visibility and a proven methodology has provided excellent results in the past.

12.3.1. Use of Metrics. Performance specifications require the identification of a standard of performance for the contractor's work. For example, an appropriate outcome specification may require the contractor to achieve a certain equipment availability. That is an outcome requirement. The metric or indicator associated with that requirement is percent (%) availability. The percentage number that the contractor must achieve is the standard (benchmark), set by the Center based on the current baseline performance that is acceptable to and being achieved by contractor or civil service forces at the Center. Unless these metrics are known, there is no rational basis for which to require a standard, and the use of the outcome specification may not be justified.

12.3.2. Reference. Refer to the NASA Guide Performance Work Statement for Center Operations Service Support Addendum (July 1999) for additional, detailed information on outcome specifications.

12.4. Partnering

Partnering describes how well the customer and the contractor work together - that is, how well they communicate,

how they resolve disputes, and how they execute the contract to fulfill each other's needs. It is a commitment by both parties to cooperate, to be fair, and to understand each other's expectations and values. It is an agreement between NASA and the contractor to work cooperatively as a team, to identify and resolve problems and to achieve mutually beneficial performance and result goals.

12.4.1. Partnering is a relationship between organizations where the following occurs:

a. All parties seek win-win solutions to problems rather than solutions that favor one side.

b. Value is placed on the relationship. There is an interdependence where if one party succeeds, all parties will benefit.

c. Trust and openness are a normal part of the relationship. The sharing of ideas and problems without fear of reprisal or exploitation promotes the fair and rapid solution to problems.

d. An environment of cost savings and profitability exists.

e. All understand that no one benefits from the exploitation of the other party.

f. Innovation is encouraged.

g. Each party is aware of the needs and concerns of the other. No actions are taken without first considering the effect they have on each other.

h. Each individual has unique talents and values that add value to the group.

i. Overall performance is improved. Gains for one party helps the whole group and are not at the expense of another.

12.4.2. NASA Centers should seek to partner with their support contractors. Benefits that are usually achieved by participating organizations include improvements in contractor-customer relationships, a reduction in claims, a reduction in time growth, a reduction in cost growth, and fair and mutual interpretations of the specifications.

12.5. Incentives in Government Service Contracts

In contracting for support it is assumed that the contractor will perform as specified in the contract. Experience has shown that contractors can meet contract requirements with performance ranging from a minimum of acceptable to a top performance of excellent. Incentives in Government service contracts are generally more negative than positive, with emphasis on invoice deductions for poor or nonperformed work. Rather than just deductions, incentives can be used to encourage the contractor to expend effort and resources and employ cutting edge breakthrough maintenance practices as used in industry to attain top performance. Following are examples of incentives that could be used.

12.5.1. Incentive Fee. An incentive fee provision can be included in a contract to encourage the contractor, through a suitable monetary incentive, to provide the management, equipment, materials, labor, and supervision necessary for performance improvement. Most often when positive fee type incentives are used the fee starts at 100- percent and then is reduced for subjective opinions of areas of dissatisfaction. A better incentive is the reverse that is starting at 0 and increasing for areas or instances of greater objectively measurable performance.

12.5.2. Award Term. The Award-Term is an innovative incentive approach, similar to ones used in private industry. This incentive approach potentially allows continued performance of the contracted effort for an additional period of time, not to exceed some specific potential total contract period, based on overall contractor performance. A provision for a reduction in the contract term for poor contractor performance, such as up to 18 months, could also be included. An example of an award term contract follows. The contract base period could be two or three years with the first year being a start up period where the evaluation results would not be included in any award term decision. Each subsequent year the contractor technical performance would be evaluated and the results used to reduce, maintain, or increase the contract term depending on the contractor performance. The performance requirements could also increase with time. For example, say the contract is a 3-year core term contract. If performance is rated very good for the 2nd and 3rd years then years 4 and 5 are added. If the 4th year rating is excellent, a 6th year is added. If the 5th year is rated excellent, a 7th year is added, and so on for a maximum contract term of 10 years. Of course an Award Term Evaluation Plan must be prepared for use in this process. Appendix I includes a draft plan included in a Glenn Research Center procurement for services at Plum Brook.

12.6. Quality Assurance

Quality Assurance (QA) is a program undertaken by NASA to provide some measure of the quality of goods and services purchased from a contractor. How much QA is necessary depends on the quality of the contractor, criticality of the services and the nature, amount and assumption of risk involved. The QA Plan should be developed concurrently with the Performance Work Statement (PWS), Section C, since the latter defines the work outputs and the quality standards, while the former defines how the work outputs will be observed and measured.

12.6.1. Risk Management. Risk Management is an organized method of identifying and measuring risk and

developing, selecting, and managing options for handling these risks. It is NASA policy to include Risk Management as an essential element of the entire procurement process, including contract surveillance. It implies the control of future events, is proactive rather than reactive, and is comprised of four elements:

a. Risk Assessment. Identifies and assesses all aspects of the contract requirements and contractor performance where there is an uncertainty regarding future events that could have a detrimental effect on the contract outcome and on NASA programs and projects. As the contract progresses, previous uncertainties will become known and new uncertainties will arise.

b. Risk Analysis. Once risks are identified, each risk should be characterized as to the likelihood of its occurrence and the severity of its potential consequences. The analysis should identify early warning signs that a problem is going to arise.

c. Risk Treatment. After a risk has been assessed and analyzed, something should be done about it. Alternatives include:

(1) Transfer. Transfer the risk to the contractor. For example, modify the contract requirements so that the contractor has more or less direct control over the outcome.

(2) Avoidance. Determining that the risks are so great that the current method is removed from further consideration and an alternative solution is found. For example, deleting a specific element of work from the contract to have it assumed by the on-site researchers.

(3) Reduction. Minimizing the likelihood that an adverse event will occur and/or minimizing the risk of the outcome to the NASA program or project. For example, increasing the frequency of surveillance, changing the type of surveillance and/or identifying alarm situations and promptly meeting with the contractor to resolve this and future potential occurrences.

(4) Assumption. Assuming the risk if it can be effectively controlled, the probability of risk is small, or the potential damage is either minimal or too great for the contractor to bear. For example, allowing the contractor's own Quality Control of certain custodial functions at a remote location be the sole Quality Assurance surveillance method for the Center for that work.

(5) Sharing. When the risk cannot be appropriately transferred - nor is it in the best interest of the Center to assume the risk - the Center and contractor may share the risk.

d. Lessons Learned. After problems have been encountered, the Center should document any warning signs that, with hindsight, preceded the problem, what approach was taken, and what the outcome was. This will not only help future acquisitions, but could help identify recurring problems in the existing contract.

12.6.2. As part of the cost conscience emphasis practiced throughout NASA, it is undesirable to perform a 100-percent inspection on all work performed, but rather, considering risk as discussed in paragraph 12.6.1 select the optimum combination of inspection methods, frequencies and populations that, when applied to a sample population, will be indicative of the whole. The use of an ISO-9000-type QA program is predicated on the following:

a. The contract vehicle is a combination firm-fixed-price and IDIQ negotiated procurement based on evaluating technical and cost proposals and past performance.

b. The Request for Technical Proposal's evaluation criteria heavily considers past performance and requires the offerors (and their subcontractors) to address how they intend to meet the quality standards for the specific contract.

c. Award is based on a Best Value consideration of price and technical merit and past performance.

d. A partnering concept and agreement are in force to reduce adversarial relationships and foster a team approach to providing the required services.

In general, this approach starts with minimal performance evaluation, recognizing the high expectations of good performance from a quality contractor. The follow-on degree and type of monitoring of the contractor's work depends on the overall performance and the perception of increased or decreased risk to the desired outcomes. Closer scrutiny may be in order if there is a downward trend in performance, if the degree of unacceptable risk increases, or if the performance is otherwise unacceptable. Less frequent inspections, or a less stringent method, may be selected if the contractor's performance is constantly superb, if there is greater comfort level in risk to the desired outcome, and there is a high degree of satisfaction. The key is flexibility in assigning available Quality Assurance Evaluators (QAE) assets where they are needed most. Consult the NASA GPWS (Guide Performance Work Statement) for COSS for a more detailed discussion of the QA program.

12.6.3. Quality Assurance Methods of Surveillance. There are seven generally recognized QA surveillance methods. The successful QA Plan, considering the number of QAE's, will use a combination of any or all of these, based on the population of items inspected, their characteristics and criticality, and the locality of the service. Where sufficient Government QAE's are not available a third party (Contractor) could be used to perform the QA function for the Government. These seven methods are the following:

a. 100-percent Inspection. Usually used for services that are considered critically important, have no redundancy, have relatively small monthly populations, and/or are included in the indefinite quantity portion of the contract.

b. Random Sampling. Uses statistical theory to determine the performance of the whole while evaluating only a properly selected, statistical sample. Random sampling tables are used to determine the required sample sizes, and random number generators are used to determine the samples to be evaluated. Random sampling is useful when evaluating a large, homogeneous population.

c. Planned Sampling. Similar to random sampling (less the statistical accuracy) in that it is based on evaluating only a portion of the work for estimating the contractor's performance. Samples are selected based on subjective rationale and the sample sizes are arbitrarily determined. Planned sampling is most useful when population sizes are not large or homogeneous enough to make random sampling practical.

d. Unscheduled Inspections. These types of inspections should not be used as the primary surveillance method, but rather, in a supportive role. This inspection method may be used where there has already been an indication of poor performance or excessive complaints. The additional unscheduled inspection could confirm the situation.

e. Validated Customer Feedback. A valuable method of evaluating the contractor's performance with minimal QA assets expended. It is important that the QAE validates all feedback prior to addressing the situation with the contractor. This evaluation method is most valuable for routine, recurring and noncritical work, such as custodial services, grounds maintenance and refuse collection.

f. RCM Metrics and Trends. Another surveillance method is the use of RCM based metrics and reliability trending. The QAE can use metrics to assess the performance and effectiveness of maintenance actions as discussed in paragraph 7.9.6, Performance Contract Monitoring. See Appendix F for some of the metrics that may be used for this QA method.

g. Contractor Quality Control Centered. Obtaining self assessment feedback from the contractor's program and validating it as necessary is the least labor intensive method for NASA QAE's. It relies on the Quality of the contractor's own Quality Control (QC) program. It is best used when the contractor performance is repeatedly excellent and reliable, the work is relatively noncritical, and is used in conjunction with other inspection methods. In addition to the contractor's QC program the contractor may be required to perform QA of the QC program. In the contractor's QA program the contractor would have a specific approach to monitoring end services to ensure that they have been performed in accordance with the specifications and that the QC program is performing satisfactorily. The contractor QA reports could be used by the QAE as one input in evaluating the contractor's performance.

12.6.4. Performance Requirements Summary (PRS)

12.6.4.1. The PRS summarizes the work requirements, standards of performance, and Maximum Allowable Defect Rates (MADR) for each contract requirement. It is used by the QAE's in the QA program and by the Contracting Officer in making payment deductions for unsatisfactory performance or the nonperformance of the contract requirements.

12.6.4.2. MADR. MADR's are defect rates, or a specific number of defects, above which the contractor's quality control is considered unsatisfactory for any particular work requirement. The MADR value selected for any particular work requirement should reflect that requirement's importance. For example, the MADR for timely emergency TC response should be less than that for routine TC response. It is important to understand that in fixed price contracts, the contractor does not get paid for work not performed or that is unacceptable relative to the performance requirements summary, regardless of the MADR. However, the MADR is that point where the contractor should receive a formal notice of deficiency or where more serious administrative action is warranted. There is no need for the Government to advise the contractor of how much leeway is authorized for nonperformance, and therefore, no requirement to advise the contractor of the value of the MADR.

12.6.5. Quality Assurance Plans. QA Plans are systematic procedures that, in a planned and uniform manner, provide guidance for the quality assurance evaluator(s) in their methods and degree of scrutiny to be used in surveillance of contract performance requirements. Each QA Plan may have one or more Surveillance Guides for inspecting sub tasks. Items to be addressed include the following:

a. Identification of the contract requirements.

b. Work requirements and standards of performance.

c. Primary methods of surveillance to be employed.

d. Maximum Allowable Defect Rate.

e. Quantity of work to be performed.

f. Level of surveillance to be employed.

g. Size of the sample to be evaluated.

h. Evaluation Procedures.

i. How the results will be analyzed.

Each QA Plan should be a self-contained document written in sufficient detail to preclude extensive reference to other documents or manuals. The use of QA Plans ensures conformity, consistency and standardization in how QA inspections and evaluations will be made over time and between different QAE's monitoring like-functions. QA Plans may be modified and should be maintained up-to-date as necessary. The QA Plan supplements, but is not part of the contract, and as such, the contractor should be advised of the existence and use of a formal QA Plan, but not provided access to it.

12.6.6. Quality Assurance Evaluator (QAE) Staffing. The QAE assists in evaluating the adequacy of the contractor's performance under each work requirement in the Schedule of Prices (Section B of the contract). The following are specific QAE responsibilities:

a. Accomplishing surveillance required by the contract surveillance plan.

b. Completing and submitting to the COTR, inspection reports as required in the contract surveillance plans.

c. Recommending to the COTR the verification of satisfactorily completed work, payment deductions, liquidated damages and other administrative actions for poor or nonperformed work.

d. Assisting the COTR in identifying necessary changes to the contract, preparing Government estimates, and maintaining work files.

e. Making recommendations to the COTR regarding changes or revisions to the PWS and contract surveillance plan.

f. Maintaining accurate and up-to-date documentation records of inspection results and follow-on actions by the contractor.

12.6.6.1. Minimization. Ideally, QAE staffing should be based on a predetermined number of contract inspections and related work requirements rather than on the availability of QAE's. Realistically, personnel constraints are a way of life. Therefore, flexibility should be used and the number of QAE's determined by adjusting the degree of QA performed in terms of population and degree of scrutiny from month to month depending on the contractor's performance for the previous period and the criticality of the work being performed. Quality Assurance evaluations based solely on customer feedback and documentation for relatively routine, noncritical work require very few, if any, QAE's. One hundred-percent (100%) inspections of critical research-related processes, on the other hand, would likely require an extraordinary amount of QAE support. Where adequate staffing is not available all or part of the QA function could be contracted to a third party as a solution.

12.6.6.2. QAE Qualifications. Personnel tasked with monitoring the contractor's performance must be experienced in the technical area being evaluated and adequately trained in QA methods and procedures. Skills required include QA Plan development, inspection techniques, PT&I techniques (if appropriate), and contract administration skills such as documentation, making deductions, and calculating recommended payments.

12.7. Credit Card Procurement

As a means of reducing contract administration, small IDIQ purchases are successfully being procured by credit cards at several NASA Centers. NASA Management issues Government credit cards to various authorized Government employees for use in obtaining materials, equipment, and work and/or services for the Center. The contractor(s) would need to have and maintain an appropriate vendor's credit card account to accept these cards up to an authorized limit (commonly, $2,000 to $5,000 each purchase). When the contractor is contacted by the authorized cardholder requesting work or services, the contractor and requestor define and mutually agree on the task to be provided. Once agreement is reached concerning the scope, schedule and fixed price to accomplish the task, a credit card is presented by the requestor and accepted by the authorized contractor representative to consummate and document the understanding. All transactions and historical information must be recorded in the CMMS.

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